1 UTILITY PATENT APPLICATION:

2 INVENTOR: Joseph C. Anders, et al
3 TITLE: TELEPHONE SYSTEM

4 PREPARED BY:

5 **GREGORY M. FRIEDLANDER & ASSOCIATES, P.C.**
6 *Attorneys at Law*
7 *11 South Florida Street*
8 *Mobile, Alabama 36606-1934*
9 *Phone (334) 470-0303*
10 *Fax (334) 470-0305*
11 E-mail: Isee3@aol.com

12 DATE: February 26, 2000

13 <u>PRIORITY</u>

14   This patent claims priority of patent serial number 08/587,084 filed January 16th, 1996 and

15 patent serial number 60/163,057 (provisional) filed November 2nd, 1999.

16 <u>BACKGROUND OF INVENTION</u>

17 <u>FIELD OF INVENTION</u>

18   The technology relates to telephone monitoring, comparing and recording devices.

19 <u>PRIOR ART</u>

20   Recording of telephone calls dates back to the 1920 (an example from Hellwarth is the

21 Rice patent, 4,712,230) and digital recording dates 4,054,756 in 1976.

22   It would be beyond the scope of what we do on a day to day basis to perform an

23 infringement analysis.

1   HELLWARTH: (FILED 4/20/89)

2   The '956 basically comprises an electronic computer system for control of a telephone

3   instrument having the following elements:

4   1.   A computer.

5   2.   A connection between the computer to a conventional telephone and switch

6   network.

7   3.   A means for generation of detection of telephone signals.

8   4.   A playback mechanism for stored messages.

9   5.   A detection mechanism for received voice messages.

10   6.   A measuring means for amplitudes and timings and other forms of signals.

11   7.   A means for selectively communicating with the calling party.

12   8.   A means for selectively communicating with the destination party.

13   9.   A means for selectively communicating with a third party (The exact method of

14   doing this is not well defined).

15   10.   There is a means to control the continuation of telephone calls on two fronts: that

16   permit validly charged calls to proceed and to prevent calls and to terminate calls

17   where there is an invalid credit card number as well as originating calls to

18   alternative number other than the numbers supplied by the calling parties.

19   11.   As a means for transmitting credit card account numbers to automatic equipment

20   and to parties at the alternative number in the prior numbered paragraph.

21   12.   There is a means for detecting tone and voice signals to indicate the credit card

22   status number validity and then there are means for other processes.

2

1   Claim 7 includes a means for diagnosing problems and failures in the hardware and

2 software and a means for the automation computer to alter its own information and programs for

3 writing and rewriting of programs and a means for updates the software.

4   Claim 8 involves a means for electronic storage of data, within the automation computer

5 referred to above;

6   a means for conversion of signals into discrete, quantified units (this may refer to a digital

7 conversion);

8   a linear filter means for the discrete data 'quantified units' from the prior paragraph a

9 storage and a digital computer;

10   a means for processing the data by stored programs;

11   a means for communicating the data and a means for conversion of the digital data into

12 (apparently) un-logged signals;

13   amplification means;

14   a coupling means without putting the signal means for the means for security key storage

15 or other control of the current;

16   a means for comparing the security codes;

17   a means for encoding data using a storage key code which would require that the coding

18 by the receiving computer would require a key code;

19   a means counting unsuccessful attempts at establishing communications through the

20 matching of key codes and

21   a means for outputting data communications to a third party by notifying them of various

22 security breeches.

1   Claim 16 comprises a telephone instrument at a given site and a computer at that same site

2   for enabling the use of the telephone instrument requiring the acceptance of charges without the

3   intervention of a individual.

4   Hellwarth was filed in 1989 and Global's phones with on-site cpu's which were in

5   circulation well before the filing date. In fact Dively, cited in Hellwarth shows a telephone with

6   a CPU filed in 1985.

7   Claim 28 is almost a method of doing business. This claim broadly covers the steps of

8   selecting a site and installing a computer to allow calls without a human operator and connecting

9   the computer to one or more telephone instruments in a remote switch network.

10   Claim 32 is the last independent claim which includes a computer for modifying the

11   operation of one or more telephone instruments to get acceptance information before the call is

12   made.

13   Claims 21 through 42 were added later and were directed to the onsite connection of an

14   automation computer to one or more telephone instruments. As mentioned, this was common at

15   the time because pay phones were present which had central processing units.

16   BROWN (FILED 8/20/93)

17   Brown is a phone patent directed towards selectively blocking or recording calls in

18   response to some parameter. There are "parameters" marking calls where the parameter is a

19   specific number, a triggering event, or a call feature or a type of call (such as a call to a specific

20   number). Most of these events are at least generally present in the prior art as shown below. For

21   example a message in response to a third line on a party call (4,477,698) would be similar "three

22   way calling". Termination or blocking of calls at this stage is covered in prior art, but not cited

4

1   in the Brown application. Hird I-IV, discussed below (1990 issue dates), shows methods of

2   reacting to call specific 'parameters'. Hird is also ignored in the Brown prosecution. The calls

3   are continuously monitored for the parameter in question, calls may be blocked or recorded

4   selectively and messages may be played back. All of these features are also shown below in the

5   prior art.

6   GATEWAY II-McFarlen (filed 3/11/96)

7   Shows a method for determining three way call events. Its relevance is in question, but

8   the prior art cited may be relevant, since it references Hellwarth and has a common assignee.

9   HIRD-I-V

10   The Hird patents cover operator free call placement.   All of the claims involve an

11 'electronic operator' where the phone has stored messages for collecting information from the call

12 maker and call recipient. Billing information is also retrieved. Storage of call data information

13 (mainly for billing) and automatic termination is discussed. Speech files are digitized and stored

14 for purposes of playback within the phone. The main concept follows the prior art where the

15 operator's various tasks are replaced by the cpu and automated responses along with a time

16 keeping function for billing.

17   Another curious factor is that all of these patents except one (a continuing application)

18 were filed on January 23, 1989. A more complete examination of the file wrappers would be

19 called for if the technology were felt relevant.

20   There have been 'electronic operators' within phones sold since 1989. These phones

21 were purchased from inventories of such phones, although there were various upgrades to the

22 systems as software design and hardware capabilities were refined. Some of this technology was

1 felt to be present and in wide-spread use before 1989. A discussion of the pre-Hellwarth prior

2 art (from Hellwarth) will shed some additional light.

3 Patent 4,027,109 discusses call forwarding. Manipulation (termination) of some call

4 features is discussed. 4,054,756 is a billing acknowledgment system for phones accomplishing

5 the tasks claimed in Hellwarth and Hird to some extent. Other aspects of the patents examined

6 are also disclosed, for example claim 3 appears to be a digital storage of data. Encoding of data

7 is discussed in Claim 10. Significantly, there is no requirement that the system be "off sight" as

8 claimed in Hellwarth. Another similar patent in scope is Frey, 4,737,577.

9 Patent 4,371,752 covers storage of telephone data (more in the form of a high tech

10 answering machine). Forwarding of the calls is covered. Storage and retrieval of call specific

11 data is also covered. 4,477,698 appears to be an early patent for establishing a line signal of a

12 desired type (a telephone pick-up) and providing information primarily for controlling party lines.

13 Patent 4,540,855 is another signal detection patent.

14 Rice, 4712,230 is a system for storing and monitoring telephone call discrete information.

15 "Status" data is transmitted to a CPU. Diesel, 4,723,273 is a forwarding patent which allows

16 data from the call to determine if it should be forwarded.

17 GENERAL DISCUSSION OF THE INVENTION

18 The invention is a telephone system having unique monitoring methods and equipment

19 to allow the user to following conversations and retrieve portions of the conversation and to take

20 certain actions in connection with conversations. The system has 2 parts. The first part is a novel

21 grouping of elements for greater efficiency, lower costs and convenience. The second part is a

22 method of manipulating telephone data and interacting with the novel grouping.

1   There may be two groups of users within the system, the first being the maker and

2 recipient of the call and the other being a person or device monitoring the call. PIN markers are

3 also disclosed.

4   Several main components are required to form the telephone apparatus about to be

5 described. Of course, one component is the above-discussed phone system installed at a facility

6 to provide access control for the telephones located there. The phone system of the facility

7 operates in conjunction with a central office which is remote from the facility, perhaps even

8 hundreds or thousands of miles away. The central office handles many such facility phone

9 systems. Another of the main components is a computer workstation located at the facility. This

10 is a PC-based apparatus with a variety of tasks, primarily in the nature of an interface. A

11 recording system is another of the main components. It is also located at the facility. Finally, a

12 file server with mass storage is also located at the facility to complete the telephone apparatus.

13   As can be ascertained from the above, the facility accommodates the workstation, phone

14 system, recording system and the file server with mass storage. These are all networked together.

15 The workstation is utilized as an interface to the telephone system to enter data for controlling

16 access by the telephone, and individual users thereof, to the PSTN. The workstation is also an

17 interface to the recording system in order to control which phone conversations are recorded. In

18 addition, the workstation is utilized to retrieve data from the file server and its mass storage.

19   The remotely-located central office provides a variety of services for the facility. The

20 facility phone system and the central office are in communication through the PSTN by modem

21 or through a direct wire. In either case, a connection between the central office and the facility

22 phone system can be made as and when the need arises. Such need arises in the following ways.

1   When access from a phone to the PSTN is sought by a caller, whether or not the call will

2 be connected is a decision made by the central office. More specifically, when an inmate (in the

3 prison example being used) wishes to make a telephone call, he will pick up a telephone and enter

4 the multi-digit personal identification number (PIN number) which was assigned to him. At that

5 point, the facility phone system will call the central office to communicate this information. The

6 central office will perform a two-part validation check. The first part determines, based on

7 phone-related data and PIN number-related data that it has previously received from the

8 workstation via the facility phone system, whether based on the phone-related data the particular

9 phone being used is within its activated time period, and whether based on the PIN number-

10 related data the inmate qualifies for the requested call. In particular, such PIN number-related

11 data reveals (1) whether the owner of the PIN number is permitted to use the phone now and (2)

12 does the owner of the PIN number have the privilege of accessing the destination number. If so,

13 then the call has passed one part of the validation check. The second part of the validation check

14 determines whether the destination number is a billable number. This is important because the

15 call must be paid for. The inmate typically does not pay for the call (although a pre-payment

16 arrangement is available). The call normally must be made on a collect call basis. However, this

17 creates the possibility of fraud if, for example, the destination number belongs to a pay phone.

18 Thus, at this point the central office dials a service provider (such as SNET, TNS) that maintains

19 a data base which can be used to ascertain whether the destination number is billable. If so, then

20 both parts of the validation check have been satisfied, and the call is connected. In addition to

21 performing validation checks, the central office also performs maintenance, billing, housekeeping

22 and various other functions which are not directly pertinent to a description of the invention.

1   Just before the call is connected following the successful completion of a validation check,

2   the recording system determines whether this call should be recorded. Recording control data is

3   provided to the recording system from the file server, where it was previously stored by the

4   workstation, and this data is compared with the call-related data (e.g. the origination number, PIN

5   number, destination number). If the conditions set by the recording control data are met, then the

6   conversation is recorded. When the call is ended, the recorded conversation data is transferred,

7   or migrated, to the file server. The conversation data is stored together with the call-related data

8   and other data useful to facilitate locating and retrieving a particular conversation. When the need

9   for retrieving a particular conversation arises, certain search parameters are manually entered into

10   the workstation which then communicates with the file server to identify and locate the

11   conversation in storage. The specified conversation is then retrieved and made available on the

12   workstation for display and/or audio playback.

13   It is an object of the invention to provide a telephone monitoring device for reading a

14   biological marker for an individual and associating the marker with a pin number and associating

15   the pin number with other call information to be stored with data on the call.

16   It is an additional object of the invention to provide a phone system with an interface

17   means for storing information on a call from a group of information comprised of the locations

18   from and to which the call is made, the PIN number and name or the maker, time when made and

19   when finished, data of the call, telephone numbers and the like.

20   It is an additional object of the invention to convert the telephone call to digital format for

21   storage and to maintain a database of data, voices or sounds in a digital format, particularly

22   secondary ring signals, and to compare the digital database of voices or sounds or data

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1 (particularly phone numbers, names, addresses and area codes) based on user controlled degrees

2 of similarity and to take different actions from a group of actions including monitoring, marking,

3 terminating or playing a recording before, after or in conjunction with the ongoing call.

4 It is a further object of the invention to feed the data to the comparing mechanism at an

5 accelerated rate, typically 4 to 5 times the speed of the original call, with or without filters for

6 which isolate voice ranges or data ranges, with or without pitch attenuation to keep the voice at

7 an apparently normal pitch.

8 It is a further object of the invention to encode the information in a format providing that

9 any alteration of the data will result in a mark showing the data has been altered.

10 It is a further object to allow for data to be selected, stored or played back to be altered

11 at a graphical user interface, such as a keyboard type entry.

12 Another object of the invention is to facilitate the use of a phone system located at a

13 facility to record phone conversations originating from any of its telephones.

14 Another object of the invention is to facilitate the selected retrieval of phone conversations

15 recorded by the phone system.

16 A further object of the invention is to control access by individual telephone users to the

17 PSTN.

18 Yet another object of the invention is to control the recording of phone conversations

19 based on the identity of individual telephone users.

20 Still another object of the present invention is to determine the destination number

21 accurately and store it for later use.

22 These and other objects of the invention are attained in accordance with one aspect of the

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1 invention which is directed to a telephone system for communicating telephones located at a

2 facility with a public switched telephone network (PSTN). A switching means connects the

3 telephones with the PSTN. Access control data is provided which includes phone-related data

4 and PIN number-related data. Control means actuates the switching means in accordance with

5 the access control data.

6   Another aspect of the invention is directed to a telephone apparatus for communicating

7 telephones located at a facility with the PSTN. A phone system is located at the facility,

8 including switching means for connecting the telephones with the PSTN. Access control data

9 is provided which includes phone-related data and PIN number-related data. Control means

10 actuates the switching means in accordance with the access control data. A computerized central

11 office is located remotely from the facility. A computer workstation is located at the facility

12 along with a computer file server, a computerized recording system and means for communicating

13 the central office, workstation, file server and recording system.

14   Yet another aspect of the invention is directed to a telephone apparatus for controlling

15 access by telephones located at a facility to the PSTN and recording selected phone conversations.

16 Means is provided for storing access control data and recording control data. Call-related data

17 particular to an attempted call being made from one of the telephones is provided. A phone

18 system is located at the facility, including access control means for providing selected access from

19 the one telephone to the PSTN by connecting the attempted call based on a comparison of the

20 access control data with the call-related data. Recording means is coupled to the phone system

21 for recording conversation data generated when an attempted call has been connected to the

22 PSTN. Recording control means selects which connected calls are to be recorded based on a

11

1   comparison of the call-related data with the recording control data. Storage means stores the

2   conversation data of connected calls selected to be recorded.

3   These and other objects and advantages of the invention will become better understood

4   hereinafter from a consideration of the specification with reference to the accompanying

5   drawings forming part thereof, and in which like numerals correspond to parts throughout the

6   several views of the invention.

7   BRIEF DESCRIPTION OF DRAWINGS

8   For a further understanding of the nature and objects of the present invention, reference

9   should be made to the following detailed description taken in conjunction with the accompanying

10   drawings in which like parts are given like reference numerals and wherein:

11   Figure 1a-1b is a flow chart showing the devices as they communicate.

12   Figure 2 is a flow chart for operating the work station of Figure 1.

13   Figure 3 is a flow chart for operating a central office with which the phone system of

14   Figure 1 communicates and interacts.

15   Figure 4 is a flow chart for operating the phone system of Figure 1.

16   Figure 5 is a flow chart for operating the master recording unit of the recording system

17   shown in Figure 1.

18   Figure 6 is a flow chart for operating the file server of Figure 1.

19   Figure 7 is an alternate schematic block diagram of a phone system arranged in

20   accordance with the invention.

21   Figure 8 is an alternate schematic block diagram of that shown in Figure 7.

22   Figure 9 is a detailed schematic block diagram of that shown in Figure 8.

1   Figure 10 is an alternate schematic block diagram of a phone system arranged in

2   accordance with the invention.

3   Figure 11 is a flow chart for the call monitoring function.

4   Figure 12 is a detail flow chart for the responding function for the flow chart shown in

5   Figure 11.

6   Figure 13 is a flow chart for the monitoring function of the flow chart shown in Figure 11.

7   Figure 14 is a flow chart for the central control function of the flow chart shown in Figure

8   11.

9   DETAILED DESCRIPTION OF THE PREFERRED EXEMPLARY EMBODIMENTS

10   An electronic computing system is described having parts which interact as shown in a

11   block diagram format in Figures 1a-1b for use in the monitoring of telephone communications

12   over which users can communicate by means of spoken or GUI commands through a phone bank

13   1, which may be one or a series of other phones 1a, 1b, etc. as shown in Figures 8 and 9 which

14   show the specific elements and which are described in more detail below.

15   The telephones of the telephone bank 1 are prior art devices for converting voice signals

16   to electromagnetic signals having wave characteristics. These provide analog voice and DSTM

17   tone data. The phones and imaging equipment 4 may also send digital data. A phone interface

18   controller 3 is disclosed which stores the data from the telephone. This controller 3 is a cpu

19   having a hard drive and software for accomplishing this purpose. A more detailed discussion of

20   the structure of these units follows.

21   The data from the phone 1 is then associated by way of a data generator 2 with call

22   preselected data from a group of data comprising start time, finish time, location numbers, pin

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1 numbers, name of user, phone number called, location of origin, or other call variables. A data

2 generator 2, such as a clock 2, may be used in conjunction with the phone 1 or controller 3 to

3 provide the preselected data. In the preferred embodiment, the data generator 2 is within the

4 CPU.

5 An analog to digital converter 5 is present for converting the electromagnetic signals to

6 a digital format as a digital data pack containing the digital call and the call preselected data in

7 the form of collections of datum within a data storage unit 6 or means for storing the digital data

8 pack. This storage unit 6 is a hard drive operating with software within the central processing

9 unit 3. A copy of this data in its original analog format may be allowed to go to the telephone

10 company directly or through the controller when the call is completed as described in more detail

11 with reference to Figures 8 and 9.

12 The data may be separated so that originating digital data, ring and voice data may be

13 analyzed separately by a data separator means ____. The numeric data; phone numbers, PIN

14 numbers and other data generated initially in a digital format; may also maintained separately

15 from the beginning but is cross referenced with the voice data of the call by the controller

16 combining means 6. The separator means ____ is also driven by software separating out the

17 desired portions of the call for the purposes described in more detail below.

18 In the preferred embodiment there are two separate comparing means, the ASR/VPN or

19 voice comparing means 16 and the DTMF comparing means 8 which are provided for analyzing

20 the voice and numeric data and the ring type DTMF data respectively.

21 As shown in Figure 1b a DTMF comparing means 8 takes the call data stored in the

22 controller 3 and compares the data to a ring tone DTMF data base 10 containing pre-selected ring

1 digital data corresponding to signals in a desired range of timing and frequency from the group

2 of ring types comprising primary rings, secondary rings, dial tones, or other numbers or data

3 comparison units. How these are identified and what option is taken is handled through a GUI

4 interface, which may be from a central office 203, a local keyboard 331 or a computer on a Local

5 Area Network 327.

6   A grouping function is provided by a separating   means 7 within the controller 3 for

7 grouping datum into datum groups (DG) comparable to the ring digital data from the DTMF

8 database 10.

9   The DTMF comparing means 8 compares the datum groups to the ring digital data (RDD)

10 from the call data from the interface means 6 in the call database. Comparing means 8 may also

11 do a comparison against a number database 18 where digital data corresponding to tones for

12 numbers are compared to digitally converted analog tones within the call data to determine if

13 specific numbers are present.

14   In order to accelerate the comparisons discussed herein an accelerator means (not shown)

15 may provided to feed the data to the comparing mechanism at an accelerated rate, typically 4 to

16 5 times the speed of the original call, with or without filters which isolate voice ranges or data

17 ranges, with pitch attenuation to keep the voice at an apparently normal pitch.

18   Alternatively the device may accelerate the data in the ring database 10 or word data base

19 14 or number database 18, discussed below, to obtain adequate comparisons, with or without

20 pitch attenuation. Acceleration of call data is desirable in order to allow near have real-time

21 analysis of the call.

22   A GUI interface as discussed above is utilized in order to generate data from which the

1 comparisons are made.

2   The comparing means for voice 16 and DTMF signals 8 utilize a comparison method

3 which includes determining on the basis of a pre-selected percentage of certainty based on the

4 amount of comparable datum based on timing and frequency between the RDD and the DG as

5 an identified group.

6   The device may also include an options data base 11, also entered by GUI, containing a

7 pre-selected group of options for a particular ring type from the group of options comprising

8 terminating the call, marking the call with a marking means for associating a marker identifying

9 the ring type with an identified group, playing a recorded message in conjunction with the call,

10 forwarding the call, monitoring the call, storing the call in a data base with the marker, or related

11 actions in communications with an output means 9 for effectuating the response from the group

12 of options outlined in this paragraph.

13   A voice comparing means 16 is used where key words or phrases or tone numbers are

14 analyzed, (as opposed to ring types or other signals, dial tones, background sounds, etc.). The

15 system may include, as a part of the phone interface means 3 a data generator 2 for associating

16 telephone communications with call preselected data from a group of data comprising start time,

17 finish time or length. Also, data reader 4 may obtain location numbers, pin numbers, name of

18 user, phone number called, location of origin, etc.

19   An analog to digital converter 5 is present for converting the electromagnetic signals to

20 a digital format as a digital data pack containing the digital call and the call preselected data in

21 the form of collections of datum. Process steps take the 48 more or less phomes into which

22 language may be separated and utilize alphanumerics to take each phome and turn it into 2

1   alphanumeric bytes as a part of or along with the analog to digital means.

2   In this case, a separate voice data base (which could be combined with the ring data base)

3   14 contains pre-selected voice digital data corresponding to specific words, numbers, area codes,

4   etc. converted to digital data in a desired range of timing and frequency from the various

5   languages are stored. There may be a GUI (graphical user interface) for entering words or

6   numbers into the database as described above.

7   There may be, in this instance, a pronunciation database means 12 for converting the GUI

8   entered words or numbers into phonic digital data corresponding to at least one pronunciation

9   (or a plurality of pronunciations) for the word. This means is shown as a pronunciation data base

10   12 for creating digital or analog data corresponding to the sound of the word entered in the GUI

11   interface for comparison to the data in the phone call.

12   Here, the voice comparing means 16 is a second CPU receiving data from the separator

13   7 in the controller 3 and comparing the data groups to the phonic digital data and determining if

14   numbers or words in the pronunciation database 12 are present in the call data on the basis of a

15   pre-selected percentage of certainty, which may be based on the amount of comparable datum

16   based on timing and frequency between the Voice digital data and the datum group as an

17   identified group. The comparison may be accelerated as described above so that a real time

18   analysis is possible.

19   An options database 17 holds options for various words, numbers or DSTM signals

20   containing a pre-selected group of options for a particular word type or data entry from the group

21   of options. The data may be modified by marking the call or the word within the call data. The

22   mark may be made with a digital or analog mark corresponding to the data type (preferably digital

1   data) to associate a particular mark identifying the ring type or word with an identified response.

2   This marking is accomplished by a marking means 23 which is a combination of software and

3   the hard drive storage in the Controller 3 and ASR/VPN voice comparing means 16.

4   The call may be modified by terminating the call, playing a recorded message in

5   conjunction with the call, forwarding the call, monitoring the call, telling the controller to store

6   the call in a data base with the mark, etc. An output means 9 is present for effectuating the

7   response where the call is modified.

8   This output means 9 is handled by the controller 3 as described in more detail below..

9   One set of responses may be to encode and mark the data as described above or to encode

10   the data with an encoding means 20. This may also be handled by the controller 3. A secondary

11   mass storage means 318 is present for storing completed encoded calls.

12   There may also be a GUI interface on the local area network 327 for obtaining digital data

13   packs or portions of digital data packs based on length from a marked phonic digital data which

14   is operated by a user who typically would not be a call participant.

15   The voice data base 14 may be a GUI interface prepared list including words, area code,

16   geographic location of called number, name list (last, first, etc.) number of the user, dial tones

17   type, telephone number, number of rings or combinations of these in serial grouping or within a

18   certain time span.

19   Utilizing this or the other data the output means is instructed from a data base containing

20   a pre-selected group of options for a particular ring type from the group of options comprising

21   terminating the call, marking the call with a marking means 23 for associating a data marker

22   within the call data identifying the ring type with an identified group, playing a recorded message

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1   in conjunction with the call, forwarding the call, monitoring the call, or storing the call in a data

2   base with the marker.

3   In this case, the output means 9 for effectuating the response may include responses withi

4   an output options database 11 which are sent to the GUI interface from the list comprising

5   alerting a listener, dialing a listener, storing the call for the listener, playing back a stored call,

6   playing the call as it is received for the listener, giving at least some of the pre-selected data on

7   the call to the listener (who is not one of the primary parties, caller and person called),

8   conferencing the call to other listeners, and encoding the call either in response to the GUI

9   interface or automatically.

10   The encoding means 20, which may include a secondary storage 318 for encoded data is

11   further described as an electronic computing system for use in the monitoring and tracking of

12   telephone communications over which users can communicate by means of spoken or GUI

13   commands comprising encoding the call data so that changes to the data make changes from the

14   group comprising: changing a numeric sum based on the data or marking the data to show the

15   change.

16   The step of encoding comprises the steps of (1) taking the digital data pack (including

17   start and finish numbers, location, pin number, digitally converted analog conversation/rings, etc.)

18   running an algorithm to select the numbers according to a preselected formula, determining a

19   mathematical equation based on the manipulation of selected numbers from the group comprising

20   (sum, subtraction, multiplication, division, integration, encryption, etc.) according to the

21   selection.

22   As a part of, or in conjunction with, the telephone means for converting voice signals to

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1   electromagnetic signals having wave characteristics there may be a Reading means 4 for reading

2   a biological marker from the group comprising thump print, finger print, retinal pattern, toe print,

3   signature, etc. In the preferred embodiment, this reading means 4 reads finger print data.

4   There is also a database 5 viewable directly or indirectly by the comparing means within

5   the controller 3 or within reading means 4 along with data from the biological marker reading

6   means 4 which database 5 contains stored copies biological person specific markers and

7   associated PIN numbers. There is, inherent in the comparison means, which may be incorporated

8   in the reading means 4, a method for comparing the biological market to the database of stored

9   copies.

10   The controller 3 may contain a pre-selected group of options, in the options database 11,

11   for a particular person identified by biological marker, PIN or credit card from the group of

12   options comprising initiating the call, terminating the call, marking the call with a mark means

13   for associating a marker identifying the ring type with an identified group, playing a recorded

14   message in conjunction with the call, forwarding the call, monitoring the call, storing the call in

15   a data base with the marker.

16   This would work along with the data bases as described above containing a pre-selected

17   group of options for a particular PIN number (or biological marker) from the group of options

18   comprising terminating the call, marking the call with a marking means for associating a marker

19   identifying the ring type with an identified group, playing a recorded message in conjunction with

20   the call, forwarding the call, monitoring the call, storing the call in a data base with the marker,

21   etc. and the output means 9 for effectuating the response.

22   Figure 7 shows the previous method depicting a telephone apparatus as including central

1 office 203 located remote from the facility. At the facility, a plurality of telephones 1, here 1a,

2 1b, etc. are connected to phone system 207. Switching system 209 schematically depicts a

3 centralized switching system and associated hardware and software of a telephone company

4 which provides a plurality of outside telephone lines to phone system 207 for accessing the

5 PSTN. One telephone line 213 schematically represents the connection of phone system 207 to

6 central office 203 via the PSTN.

7 Phone system 207 is connected to recording system 215 (items 215a, b, c, etc). Recording

8 system 215 is a multiple channel type and each channel is connected by one of lines 217 to one

9 of the external lines 211. Recording system 215 has a master recording unit 215A usually with

10 a maximum capacity of around 48 channels. If additional capacity is required, then units 215B,

11 215C... 215N (N being any integer) can be added, each of which adds a 48 channel capacity.

12 Workstation 219 is networked to the recording system 215 as well as to file server 221.

13 File server 221 is a PC with its own storage device such as a hard disk of specified capacity.

14 However, mass storage 218 for file serve 221 is available in the form of a readable/writeable

15 optical juke box.

16 One implementation available for phone system 207 is Guardian 1600 available from

17 Schlumberger Global Tel*Link in Mobile, Alabama.

18 Master unit 215A of recording system 209 utilizes a PC.

19 Each of units 215B...215N of recording system 215 has the same hardware and software

20 as master unit 15A, except that its software is configured to operate as a slave.

21 Workstation 219 is a PC with a processor.

22 File server 221 is a PC based Novell 3.12 server or a Windows NT 3.51 server, with a 1

1   Gig or larger capacity hard disk and a mass storage device, namely optical juke box 223.

2   Juke box 223 is model number MaxLyb26XT available from MAXOPTIX Corp. of

3   Fremont, California. Its storage capacity is 26 Gig, but other sizes are available.

4   The network is Ethernet.

5   In one embodiment of the invention, phone system 207 is connected to recording system

6   215 by line 220 in the form of an RS-422 connection. This connection is used for the purpose

7   of transferring call-related data from the phone system 207 so that it can be compared with

8   recording control data obtained from file server 221 to determine whether or not a phone

9   conversation will be recorded. Further details in this regard are provided below. For another

10   embodiment of the invention, phone system 207 and recording system 215 are not connected by

11   line 220. Instead, call-related data is obtained by recording system 215 from outside lines 211

12   via lines 217. Further detail on this embodiment are provided below.

13   Figure 2 is a flowchart for operating workstation 219 shown in Figure 7. The operator of

14   workstation 219 enters access control data which is to be utilized to conduct a validation check

15   when an inmate picks up a telephone to place a call. The access control data is of two types,

16   namely phone-related and PIN number-related. This workstation corresponds to one of the GUI

17   interfaces 331, 327 described above in reference to Figure 1B in the alternate embodiment

18   described in Figure 1B.

19   The phone-related data is used to determine whether the telephone is active so that a call

20   connection can be made, independent of the particular inmate that is placing the call. Thus, it

21   may be desirable to have a particular phone, or a group of phones such as those in a particular cell

22   block, controlled so that calls can only be placed therefrom during certain hours of the day and

1 only on certain days (e.g. days of the week, weekends, holidays). Moreover, a maximum duration

2 for each phone call placed from that phone can be set so that a phone is not monopolized by one

3 call.

4   In addition to entering the access control data, the workstation operator must enter the

5 recording control data which determines whether or not particular phone conversations will be

6 recorded. The recording control data can also be of two types, namely telephone-related and PIN

7 number-related. With the telephone-related recording control data, it is possible to record calls

8 made from particular ones of telephones 1 based on such parameters as the origination number,

9 destination number, time of day, day of the week, etc. Of course, this is independent of the

10 identity of the particular inmate placing the call. However, it may also be desirable to record

11 conversations depending on which particular inmate is placing the call. For this purpose, PIN

12 number-related data is entered in association with the inmate PIN number.

13   The phone-related access control data and recording control data are entered per step 30

14 when the phone system of a facility is installed and as the need for changes occur.

15   This phone-related access control data is transmitted to central office 203 per step 32.

16 This can be done either on a real time basis as each change is made, or it can be done as a batch

17 transmission for a plurality of changes and done at predesignated times, such as during off hours.

18 The access control data is store in the central office 203 for carrying out the phone-related

19 validation.

20   In step 33, the phone-related recording control data is sent to file server 221 from where

21 it is retrievable by recording system 215. The retrieved recording control data are entered per step

22 30 when the phone system of a facility is installed and as the need for changes occur.

23

1   This phone-related access control data is transmitted to central office 203 per step 32.

2   This can be done either on a real time basis as each change is made, or it can be done as a batch

3   transmission for a plurality of changes and done at predesignated times, such as during off hours.

4   The access control data is stored in the central office 203 for carrying out the phone-related

5   validation.

6   In step 33, the phone-related recording control data is sent to file server 221 from where

7   it is retrievable by recording system 215. The retrieved recording control data is used for

8   determining whether a call conversation should be recorded, as discussed above and explained

9   in further detail below.

10   PIN number-related access control data and PIN number-related recording control data

11   are entered upon the admission of an inmate, per step 34. Each inmate is assigned a PIN which

12   is a unique multi-digit number and/or alphabetic characters. Additional data is entered in

13   association with the PIN number to control access by that inmate to telephone privileges based

14   on such parameters as time of day, day of the week, weekend/holiday, and so on. In addition,

15   restrictions can be placed on the maximum duration of any phone call made by that inmate as well

16   as on the total amount of telephone spent by that inmate on calls made per day, per week, and so

17   on. It is also possible to control the particular destination numbers to which the inmate can have

18   access. This can be done by either storing a list of telephone numbers which are the only numbers

19   to which the inmate can place calls, or allowing the inmate to call any number except for a list

20   of numbers that are stored to which access will be denied. All of the access control data is

21   manually entered by the operator into the workstation 219 and stored there.

22   Step 34 also depicts the entry of the PIN number-related recording control data. The

24

1   recording control data that is PIN number-related provides control based on such parameters as

2   the destination number, origination number, time of day, day of week, etc.

3   It is also important to inhibit recording of certain phone conversations for legal reasons

4   and perhaps other reasons as well. For example, calls made by an inmate to his attorney are

5   considered privileged and, thus, recording thereof is forbidden by law. Thus, the recording

6   system must be set up so as to avoid having a call made to that particular destination number

7   recorded.

8   Once the PIN number-related access control data is entered, it is sent to central office 203

9   per step 36. This can be done in real time or by batch processing.

10   The PIN number-related recording control data is sent to file server 221, per step 37.

11   When it is desired to retrieve information from file server 221, workstation 219 is utilized

12   for this purpose. Such information can be, for example, in the form of a report or it can be a

13   recorded phone conversation. Examples of reports that can be provided are those sorted by any

14   one of the following: origination number, destination number, PIN number, frequency, call

15   duration, and group of phones (e.g. by cell block). The information included in the report is that

16   used for sorting and any and all other call data fields that are available by virtue of having been

17   stored.

18   The applicable search parameters are entered into workstation 219 to form a request when

19   retrieval of a recorded phone conversation is desired, as per step 38. As will be explained in

20   greater detail below, each phone conversation is stored along with any or all of the call-related

21   data, and possibly other data, and the search parameters that can be used correspond thereto. This

22   includes the origination number (i.e. the telephone number from which the call was placed), the

25

1   destination number, the PIN number, the time of day and the day of the week, the date, and so on.

2   The search request, as based on the search parameters that are specified by workstation 219, sent

3   per step 39 to the file server 221 which carries out the search through the conversation data that

4   is stored in juke box 223. An advantage of having such a mass storage device is the convenience

5   of being able to search through such a massive amount of data without having to interrupt the

6   search by removing one storage medium, such as a hard disk or tape, and replacing it with

7   another. This provides the requested data instantaneously.

8   A report of all of the phone conversations that fit the designated search parameters is

9   prepared by the file server and can be called up for display by workstation 219. A decision by the

10   operator can then be made as to which one of the listed conversations is to be played back. Once

11   such a selection is made, such as by clicking on the desired call of interest, the file containing the

12   conversation data is retrieved from juke box 223, and transferred to work station 219 which is

13   provided with audio capabilities. The conversation data is then utilized for audio playback

14   purposes so that the recorded phone conversation can be listened to. Step 40 generally depicts

15   the retrieval of data by workstation 219 and the display thereof (in the case of a report) and/or

16   playback thereof (in the case of a phone conversation).

17   Figure 3 is a flowchart for central office 203. In step 41, the central office receives from

18   workstation 19 all of the access related data that was stored by the operator. This includes phone-

19   related data and PIN number-related data originally derived from steps 30 and 34 of Figure 2.

20   This data is permanently stored in central office 203 and available for use as part of the validation

21   check. When an inmate attempts to place a call, the number of the telephone being used

22   (origination number), the inmate's PIN number and the destination number are transmitted to

1   central office 203, as per step 42.

2   Step 43 checks whether or not the particular telephone being used is active and whether

3   the inmate identified by the PIN number has access to telephone privileges at that particular time

4   and under the then prevailing conditions (e.g. maximum total calling time per day not exceeded).

5   Based on the result of step 43, step 44 determines whether the origination number and PIN

6   number are valid. If not, then step 45 sends an "invalid" code signal to phone system 207. A

7   particular code is used depending on the reason for the invalid status. As a result of receiving

8   such a code, a suitable message will be produced by phone system 207 to inform the inmate that

9   the attempted call is being denied. In addition, the message explains the reason for the denial (i.e.

10 depending on the code, either that the particular telephone is not available at that time or that the

11 telephone privileges for the PIN number are not then available.).

12   If the validity of the origination number and the pin number checks out per steps 43 and

13 44, then the destination number must be validated as well. The destination number is received

14 from phone system 207 by central office 203 together with the origination number and PIN

15 number as part of step 42. The destination number is checked, per step 46, by reliance on a

16 service provider utilized for this purpose (e.g. SNET, TNS). These service providers maintain

17 a data base which can be used for the purpose of verifying that the destination number is billable.

18 Thus, central station 203 accesses the service provider, such as via modem, to request this

19 information. If step 48 indicates that, based on step 46, the destination number is not billable,

20 then, per step 50, a unique code signal is sent by central office 203 to the phone system 207.

21 Phone system 207 will respond to receipt of such a code by producing a suitable message to

22 inform the inmate of the problem behind the call being denied. If, however, step 48 indicates that

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1   the destination number is billable, then step 52 conducts other access control checks. One such

2   check is whether a dollar threshold of calls billed by this PIN number to a particular telephone

3   number has been exceeded per specified period (e.g. a one month billing period). Another check

4   is whether a maximum limit on the number of calls by one PIN number has been exceeded in, say,

5   24 hours. A further check determines whether a threshold of collect call refusals by one particular

6   telephone number for calls attempted by this PIN number has been exceeded. This is designed

7   to avoid annoyance calls. If step 52 determines that, based on step 52, the call should be denied,

8   then step 56 sends a unique "invalid" signal to phone system 207 which will trigger an

9   appropriate voice message. If, however, step 54 validates the cal, then step 58 sends a "valid"

10   signal to phone system 207 which will enable the call to be connected, thereby granted access for

11   the inmate to the PSTN.

12   Finally, step 59 of Figure 3 represents the receipt of completed call data from phone

13   system 207. This data includes the origination number, the PIN number, the destination number,

14   the date, the start time of the call, the completion time, the duration, etc. This completed call data

15   is stored by central office 203 and is used for billing purposes, for example. It is sent upon

16   completion of the call or as a batch transmission, depending on how quickly the information is

17   needed at the central office.

18   Turning now to Figure 4, it is a flow chart for phone system 207. Step 60 represents

19   initialization of the system such as, for example, by entering time of day and date. Various other

20   operations can be included in step 60 which are required to place the facility in a mode in which

21   telephone access to the PSTN is available via phone system 207 through use of telephones 1, 1a,

22   and 1b. In step 62 a determination is made whether one of phones 1 has been taken off hook. If

1   so, phone system 207 produces audio (e.g., voice) prompts to inform the inmate that his PIN

2   number and the destination number must be entered, and how to do so (e.g., depress the * key

3   after each number). Step 64 generally represents all such prompts, although it should be

4   understood that a separate prompt can be used after each number is entered. The origination

5   number is determined per step 66. Phone system 207 "knows" the origination number because

6   it detects which of the lines from its telephone 1a has gone off-hook, and because a stored table

7   relates each line to a particular telephone number.

8   The inputted destination number is determined by the phone system 207 per step 68. This

9   is done by detecting the DTMF tones produced by the telephone and converting them to the

10   corresponding numbers. The technique for performing this conversion is well known and,

11   therefore, no details are deemed necessary. Step 70 stores the origination number, PIN number

12   and destination number. Once all of the call-related data has been obtained and stored by phone

13   system 207, step 72 initiates a communication mode with central office 203 and sends the

14   origination number, PIN number and destination number thereto. Step 74 determines whether

15   a "valid" signal has been received from central office 203 indicating that the origination number,

16   PIN number data and destination number have been validated by the central office. If not, then

17   based on which of the "invalid" code signals has been received from central office 203, as

18   determined by step 76, a suitable audio message is played per step 78 to inform the inmate of the

19   problem. If, however, the "valid" signal is received, then step 80 sends a call-start signal to the

20   recording system 215. In addition, the call-related data that has been stored by phone system 207

21   is provided to recording system 215 as part of an electronic message signal that also includes call

22   start signal, for reasons to be explained in detail below having to do with whether or not the

29

1 conversation of this phone call will be recorded. Step 82 then awaits receipt of an

2 acknowledgment signal from recording system 215 that the call start signal and the call-related

3 data have been successfully transferred. If no such acknowledgment signal is received within a

4 given period of time, then the message including the call-related data and call start signal will be

5 re-transmitted. If no acknowledgment signal is received despite several attempts having been

6 made (a maximum number of attempts is set to avoid an endless loop), then the call will be

7 blocked and a suitable audio message will be played, such as that the system is temporarily out

8 of order. (This step is not shown to keep the drawing from being unduly complex.)

9 If an acknowledgment signal is received, then step 84 allows the call connection to be

10 completed so that a phone conversation can take place. Following the initiation of the

11 conversation, step 86 monitors whether the call has ended, or been terminated. This step can

12 include monitoring whether the phone is placed on hook as well as monitoring the access control

13 data which sets a maximum duration for a call placed from this telephone and/or by this inmate.

14 Thus, if the telephone has not been placed on hook, at a specified time (e.g. 60 seconds) before

15 the call is due to be terminated, phone system 207 provides an audio warning message in the form

16 of a beep or by voice. (This step is not shown.)

17 Step 88 sends a call end signal to recording system 215 once the call is ended by the phone

18 being placed on hook or by termination due to one of the designated time limits (e.g. call

19 duration, total calls duration) having been exceeded. Step 90 determines whether an

20 acknowledgment signal from recording system 215 has been received. If not, then another

21 attempt (a maximum number of attempts is set to avoid an endless loop) is made to send the call

22 end signal. Once the acknowledgment signal is received, then step 92 stores the completed call

30

1 data. In step 94, phone system 207 moves the completed call data to central office 203 at a

2 suitable time (real time or batch).

3   A flow chart for recording system 215 is shown in Figure 5. Step 100 receives the

4 message signal produced by step 80 (Figure 4). Step 101 determines whether a call start signal

5 has been received from phone system 207 as part of the electronic message signal. If it has, then

6 step 102 sends an acknowledgment signal to phone system 207. Step 103 retrieves the previously

7 stored recording control data from file server 221. Of course, the retrieved data is pertinent to the

8 origination number and PIN number. Step 104 then conducts a comparison between the recording

9 control data that it receives from file server 221 and the call-related data that it receives from

10 phone system 207. Based on this comparison, step 106 determines whether the conversation

11 should be recorded. If not, then the operation comes to its end. If, however, it is indicated by step

12 106 that the conversation of this phone call should be recorded, then step 108 creates a file

13 identified by a unique file name. Step 110 records the conversation data which is written to the

14 just-created file, as per step 112. Step 114 then monitors whether the recording of the

15 conversation data should be stopped. If not, then the writing operation of step 112 continues.

16 However, if the recording is to stop, for reasons explained below, then step 116 closes the file

17 which is then migrated, per step 118, to the server with its mass storage.

18   Returning now to step 101, if a signal is received from phone system 207 but it is not

19 identified as a call start signal, then step 120 checks whether it is a call end signal. If it is, then

20 step 122 sends an acknowledgment signal to phone system 207 and also sends a stop recording

21 signal, per step 124, to recording system 215 to affect step 114.

22   Figure 6 depicts a flow chart for file server 221. Specifically, step 119 receives and stores

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1   the recording control data from workstation 219. In step 120, file server 221 obtains the files of

2   telephone conversations recorded by recording system 215. Such files include the file name, the

3   conversation data stored therein, and the call-related data associated with that particular call. The

4   files are stored by file server 221 in the mass storage juke box, as per step 122. If step 124

5   determines that recording control data has been requested by the recording system 215, step 126

6   retrieves and sends it. If step 128 determines that a request has been obtained from workstation

7   219 for a report or a designated phone conversation as per particular search parameters, file server

8   221 carries out the search and provides the data as per step 130.

9   In a second embodiment of the invention, no direct connection is provided between phone

10   system 207 and recording system 215. In other words, line 20 (Figure 1) is not used. Such a

11   situation will arise when a phone system 207 already exists before the remaining components of

12   telephone apparatus 1 are obtained, and compatibility may be a problem. With such an

13   arrangement, it is not possible to provide all of the access control data to the recording system

14   from the phone system. Thus, the destination number and PIN number entered by the caller

15   cannot be fed to the recording system. However, although the PIN number (and of course the

16   origination number) cannot be provided to recording system 215, the destination number can be

17   derived from the DTMF tones via lines 217. Thus, control of whether or not to record can be

18   based on the destination number and, of course, other parameters readily available to the

19   recording system, such as date, day of the week, time of day, etc. Based on these parameters,

20   steps 103, 104, 106, 108, 110, 112, 114, 116, and 118 of Figure 5 can be carried out. Of course,

21   step 114 will not be based on receipt of a call end signal from phone system 207 but, rather, on

22   sensing that the phone has been placed on-hook.

1   Although a detailed description of preferred embodiments of the invention has been

2   provided above, various modifications thereto will be readily apparent to anyone with ordinary

3   skill in the art. For example, incoming calls can also be handled by the telephone apparatus by

4   using the "caller ID" feature to determine the telephone number from which the incoming call

5   was placed. That data can be used to control access as well as whether to record the conversation.

6   Also, the validation check as to one or more of the origination number, PIN number and

7   destination number can be done at the facility rather than at the central office. In addition, the

8   capability for prepaid calling can be provided. More specifically, rather than handling the

9   outgoing calls on only a collect call billing basis, each inmate can prepay a certain amount into

10   an account. Then, validation step 46 (Figure 3) can be replaced with a check on the balance left

11   in the inmate's prepaid calls account. If insufficient funds remain, the call is denied. Also, if the

12   balance is exceeded during a call, the call could be terminated. Moreover, another possible

13   modification involves the situation if a destination number is dialed more than a preset threshold

14   of times, that destination number will be automatically recorded thereafter. Another modification

15   is to add a self-learning capability so that some data can be entered automatically into the system

16   rather than being inputted manually. For example, rather than manually entering a list of

17   telephone numbers that the inmate is permitted to call, this list can be generated automatically by

18   including in it all the numbers called by that inmate during a given period (e.g. one month).

19   An alternative embodiment of the invention disclosed above moves several of the

20   functions from the remote location to a local computer system which allows the same functions

21   between a local cpu and a centralized cpu but utilizes the division of functions as shown in

22   Figures 8 and 9.

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1   Referring to Figure 8, it can be seen that like the embodiment in Figure 7, the device has

2   a bank of telephones 1, comprised of one or more phones 1a, 1b, etc. These are joined to a local

3   telephone system 13 which is, in turn connected to a central control station 203. In this

4   embodiment, the phone system 13 is handled by a central processing unit (CPU) Controller 3

5   utilizing a series of voice modems 300 or comparable communicating devices joined together by

6   a BUS 310 and controlled by the controller 3 as described in more detail in the discussion of

7   Figure 9 below.

8   The CPU also communicates with several work station GUI's 328 through a local area

9   network 327 and to the telephone service provides or telephone company 335 through voice

10   modems 300. Current BUS technology allows for several voice modems 300 to be controlled by

11   a single CPU (central processing unit), here Controller 3.

12   Referring to Figure 9, the Controller CPU Controller 3 has a communications bus 310

13   which receives voice modems 300. These are powered by the controller supply power 301. This

14   bus 310 powers the phone bank 1 and receives analog or digital data from the phones 1a, 1b, etc.

15   in phone bank 1. In the prior example, the invention utilized a network of recording systems.

16   This is replaced with multiple voice modems 300 connected into the bus 310. Individual multi-

17   wire lines run from the individual voice modems 300 to the individual phones 1a, 1b, etc in the

18   phone bank 1 as known in the art for individual phones. The modems and phones used here have

19   connections designed to receive these phone lines as is known in the prior art although this novel

20   arrangement as taught alternatively in the description of Figure 7 is not known.

21   The power supply 301 for the Controller CPU provides the power for the CPU Controller

22   3 and the modems 300 through the bus 310. Another high speed digital data modem 303

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1   communicates the CDR record of the phone call and receives billing and data messages from the

2   central control unit 203.

3   One or more network cards 321 within the controller 3 communicate with the local area

4   network 327 which in turn allows the cpu Controller 3 to communicate with the GUI units 328

5   on the local area network 327. Software and hardware within the Controller CPU include

6   digitizing means analog to digital converter 5 for taking analog signals from the phone bank 1 and

7   other data generators and turning them into digital signals for storage within the controller 3 and

8   comparison purposes described below.

9   Least call routing determines the lowest cost for an outgoing call. Here, the determination

10   is made by sending the preliminary CDR record [record of what call is being placed] via high

11   speed digital modem 303 to the central control unit 203. This allows several phone systems 13

12   at different locations to rely on call data maintained at a single location. An alternative would be

13   to have information on least call routing to be periodically received by each of the phone systems

14   13 from the central control unit 203 in the form of electronic data packages which are used for

15   updating software. The central control unit 203 provides call information correcting the dial

16   string (the numbers which place the call through the telephone company to minimize the cost) and

17   possibly providing information on what output option to use if any of the database of output

18   options is located at the central control unit 203 where they may be divided between the controller

19   and the data in a central CPU unit 203.

20   Yet another interface from the Controller CPU is the Controller GUI, here keyboard 331

21   and display 332 interface which allow the user to directly access the Controller CPU and monitor

22   information from the Controller CPU.

1   Either the Central Control Unit 203 or the Controller CPU Controller 3 has software to

2   select responses and a database of recorded messages 305 to the various conditions to which the

3   system is programed to respond as set forth above. The same voice modems 300 can be used to

4   take these messages (which may first be converted from digital to analog format using software

5   and hardware analigous to the analog to digital means analog to digital converter 5) and send

6   these to the telephone company 335 or to the phone bank 1 depending on where the message must

7   be sent prior to completing the call.

8   The Controller CPU Controller 3 has a limited capacity hard drive storage means 307 (a

9   part of the interface 3 for receiving and storing data described with reference to Figure 1a) which

10   stores ongoing call data while it is processed and while the call is on-going. Also incorporated

11   within the Controller CPU Controller 3 is one or more data generators 2 which generate time and

12   date (using a clock and calendar within the computer and timing software 313) data which is

13   utilized to mark the call and to determine it's length for billing purposes as described in more

14   detail in the process descriptions of Figures 10-14 below. Also, there are databases, as described

15   above, with information giving the location of the call and identifying the user with a PIN or

16   other identifier utilizing identification association software as described above and in the process

17   descriptions which follow.

18   Data is typically split into a filename and content database 316 which contains all of the

19   digital information relating to what is said in the call and filename and call data record database

20   (CDR) 317 which is sent to the central unit 203 for billing purposes. The data is also copied to

21   the RAID mass storage unit 318 as described below. The RAID contains the file name, to allow

22   cross referencing to the CDR 317 and content. It may also maintain separately, to provide quicker

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1   and more confidential access, the filename associated with the CDR data comprised of the date,

2   time, length of call, PIN number or other identifier, phone location where the call was placed,

3   how the call was terminated, how the call was billed (debit or credit or collect or cash are typical

4   examples) how the call was accepted, who was called and the location of marked items and the

5   nature of the marked items.

6   The data within the Controller CPU Controller 3 is mirrored utilizing a mirroring means

7   302 of software and hardware within the controller 3. A network card 333 in the controller CPU

8   Controller 3 communicates with a mass storage or RAID array 318. This mass storage 318 is

9   large enough to take all of the data from several calls and store them indefinitely. This RAID 318

10   may communicate with an optical storage unit 23 as described above, although in the preferred

11   embodiment, this is unnecessary. Mirroring of data within the RAID 318 may be accomplished

12   in the same manner as that handled in the Controller CPU Controller 3.

13   The voice data in the digital format is sent, here by a network card 333, to the ASR (auto

14   speech recognition) means which is the voice comparing means 16 which recognizes keywords

15   by comparing the digital information of the telephone call from the phones in the phone bank 1

16   to a database of key words, voice database 14, and marks where the keywords are located within

17   the digital voice data. The ASR comparing means 16 may also tell the controller 3 to take certain

18   actions depending on instructions associated with one or more keywords as determined by a user

19   at a GUI interface which may be on the LAN 327. In the preferred embodiment, these actions

20   are taken by the Controller 3 based on what is identified by the ASR comparing means 16.

21   Here the ASR is a combination of speech recognition software and a CPU. This ASR

22   function may occur in real time or on recorded data. The data may come directly from the

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1   Controller 3 if the data is analyzed in real time or from the MASS storage means 318 if it is

2   analyzed historically. The nature of the analysis is determined by the commands entered by the

3   user through one of the GUI interfaces described above.

4   The ASR comparing means 16 may also act to determine the nature of DTMF signals.

5   Based on the identification which occurs, the Controller 3 may take certain steps as outlined

6   above. Any of the ASR functions may be handled by hardware and software within the Controller

7   although economies of time are recognized by having the voice recognition functions handled

8   separately from the communications functions given the amount of data which must be processed

9   in real time voice analysis.

10   It is the function of the central control 203 to communicate through the voice modems 300

11 with the telephone company 335. This may be done through the Controller 3 as a call placing

12 computer which connects and communicates with the telephone network by way of the voice

13 modems 300 using strings supplied by the central control 203.

14   Once the data has been processed, it is marked, encoded and permanently stored.

15   Figures 11 through 14 show the process steps in practicing this invention including

16 structural elements where necessary for a complete understanding of the invention.

17   Referring to Figure 11, it can be seen that an initial step to practicing the invention is

18 generating options databases 151 which the process will utilize in order to determine what actions

19 to take. These databases include PIN and Name Data, Bio-marker Data, DTMF Data, Word and

20 Phone number and generic number data, Response option data, and Second user response data.

21 While these data types are subject to sub-grouping or regrouping, for purposes of the process

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1   discussion which follows, they are identified separately in this fashion.

2   Once the system has sufficient options to function, the next step is inputting call data 152

3   from the end user originator of the system, typically a prison inmate. Simultaneously, the step

4   of generating Date and Time data 153 occurs. This is typically accomplished by a calendar-clock

5   combination internal to the Controller CPU. The step of Inputting Bio-marker data 154 may be

6   a pre-requisite to the call data 152 or may occur during the process at this stage.

7   While the exact order of these processes is subject to some variation, the step of

8   combining the data 155 and then converting the analog data to digital data 196. If some of the

9   data originates as digital data, it would be combined after the conversion. The next step is

10   separating the data 156 for analysis follows the accepting of the data. The types of analysis occur

11   at two different locations. One is the controller unit and one is the central unit. The central unit

12   initially only handles billing and call placing functions.

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14   The next step is comparing 157 the data to the data generated in step 151. The system

15   then engages in responding 158 based on the comparison of actions.

16   Figure 12 shows the steps associated with responding which include terminating the call

17   159 based on information held in the controller data or sending the call information to the central

18   processing location 160 for placing the call. This function may be moved to the local computer,

19   but for purposes of the preferred embodiment, this is handled at a remote facility. This

1   information is retained for billing information and is supplemented at the termination of the call

2   with the termination information.

3   The next step is that the central location takes steps which are shown in Figure 14. There

4   is generating data 161 which mainly consists of least call routing and call placing data. The

5   computer at the central location takes the steps of receiving call data from the controller, storing

6   the data from the controller, comparing the data to the call placing data and generating call data

7   166 which is then sent back to the controller by way of the step of sending call data back to the

8   controller 167.

9   Referring back to Figure 12, the next step at the controller is receiving information from

10   the central computer 162. Based on the information received the next step is responding 168 by

11   terminating the call 169 or by connecting the call to the telephone company. After the connection

12   is made, the next step is soliciting a response from the second end user 171. This utilizes a

13   database of solicitation options. A response is received from the user and the next step is

14   comparing the response of the second user 173 to a database of second user rsponses 174 which

15   results in terminating the call 175 or monitoring the call 176 according to the list of options for

16   connecting and monitoring calls.

17   At any stage where the call is terminated, the termination step may include the step of

18   informing the first end user of the system of the reason for the termination or such other message

19   as is appropriate under the circumstances.

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2   The monitoring options always include connecting the call 195 so that the two or more

3   end users may engage in the conversation desired. The monitoring options database allows for

4   a number of responses. Initially these include, in the preferred embodiment storing the data 178

5   which may include the step encoding the data 180 and may include mirroring the data within the

6   controller 183 or storing the data in a mass storage unit 184. It may also include the subsequent

7   steps of accessing or retrieving the data 185 or decoding the data 186 which may include the step

8   of reconverting the data from digital to analog format or reducing the digital data to a typed

9   format.

10   While the data is stored to the extent necessary, the purpose of comparing 181 the digital

11   voice data of the phone call from the interface means 6 to the voice database 14 in ASR voice

12   recognition and comparison means16 shown in Figure 9, located in close proximity to the

13   controller 3 is in order to allow real time (or near real time) comparison.

14   If a comparison is made, the next step is marking 189 the data and combining 188 the new

15   data with the old data stored in the interface means as data for storage shown as 179.

16   Simultaneously, the call may be terminated as shown in terminating step 187 as a response. Other

17   responses are notifying 190 a third party of the occurrence, and sending the information to the

18   controller 3 which upon receiving 191 the data in step 188 compares the mark made in the

19   marking 189 of the data to a database of options 11 and responding 193 accordingly by

20   terminating the call 187 or by various forms of monitoring 194 as described above.

21   Because many varying and different embodiments may be made within the scope of the